BRUARY, 1925 EXTENSION CIRCULAR No. 147

# TRAINING AND PRUNING YOUNG APPLE TREES

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FIG. 2—Five-year-old Stayman tree lightly pruned. Note size of tree. Other trees of same age, heavily pruned as in Fig. 1, produced no fruit.

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RALEIGH

TRIBUTED IN FURTHERANCE OF THE ACTS OF CONGRESS OF MAY 8 AND JUNE 30, 1914

## SUMMARY

Pruning influences the form and function of trees.

Mechanically strong trees, early fruitfulness, and large crops are the main objects of pruning and training.

The modified leader type of trees combined with corrective pruning in the form of thinning out with a minimum of heading back, lends itself best to the attainment of these objects.

Annual heading back reduces the size of trees and prevents early bearing.

Light pruning results in larger trees which come into bearing one to four years earlier.

Don't go to the extreme of no pruning whatever, for some cutting on the young trees will be necessary to properly space the framework branches and keep them in balance.

Do not prune off the spurs and short shoots from the scaffold limbs, for the first fruit of the tree is produced on this wood.

# raining and Pruning Young Apple Trees

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The commercial fruit grower is interested in profits, and counts the ree of success of his undertaking by the amount of profit secured. om a production standpoint, there are many factors influencing the ablishment of an orchard on a successful basis. In the chain of pro- tive factors, the link of pruning and training young trees is one of reme importance, because it influences to a great degree the form and ction of the trees; consequently, it determines their mechanical ength, the age at which they come into bearing, their size and their ductivity.

## DISTINCTION BETWEEN TRAINING AND PRUNING

The terms, training and pruning, are sometimes used to mean about same thing. However, if strict interpretation is put upon them, the wer will be assisted in clearing his mind to a certain extent. Train- should be considered to refer to the form and type to which the es are being directed. Pruning may be considered to refer to the ree of cutting as influencing the function of the trees. Pruning is actual process of removing a portion of the trees, of determining at the trees do, and of aiding in the regulation of growth and fruit- . Training relates to form, pruning to function. Growers, in the t, have made the error of being guided too much by the appearance the trees, and have pruned and trained them primarily from the ndpoint of appearance rather than function. With the application plant physiology to the field of fruit growing and pruning, growers e realized that the more important application of pruning affects functional activities of trees primarily, and appearances second- ly. Too often trees have been artistically butchered, and the ner has stepped back and said, "Those trees are properly pruned; how symmetrical they look." But now the modern grower has eloped a different attitude and sees deeper into the activities of trees n their mere form; and when he has finished pruning, they may not artistic trees at which to look, but the grower realizes that he is lding stronger, larger trees, and of a type that will bear much earlier n those pruned to his former artistic type.

## OBJECTS OF PRUNING

The objects in the mind of the apple grower when he prunes young es should be to secure mechanically strong trees, capable of support- ; large crops of fruit, and so shaped to let light to all parts, to secure es that will produce large crops of high quality, and to produce trees t will come into bearing at an early age. These three considerations

are greatly influenced by pruning, and each of them has been defeat in many orchards by the failure of the grower to understand princip involved in pruning, and to have a definite type in mind.

## PRINCIPLES

While pruning is yet to a certain extent in an experimental sta and the recommendations on some of the details will change from ti to time, there are some general principles that have been proved co clusively and can be accepted by the grower as the basis for his ope tions:

(1) To lessen total growth in any branch or part of the tree, cut th branch or part heavily. To increase total growth in any part, pru that part lightly.

(2) Equal cutting back of two branches arising from a comm point, and having practically the same amount of growth, will res in equal growth, and unequal cutting back will result in unequal growt Heading back may maintain or destroy balance between two branch Two branches of equal length coming from the same place as to for a sharp "Y" often results in a weak crotch unless preventive measur are used. If these branches are headed back the same, it will not bett the condition, but if one branch is headed back more than the other will encourage the longer branch to grow more and eventually becon the leader or main branch, and the shorter one become a lateral or si branch.

(3) Generally speaking, the greatest growth response takes place the immediate vicinity of the pruning wound. This is noticeable wh a large branch has been removed, where near the point of removal the is formed a number of water sprouts. It is noticeable where a branc is cut back, usually a few lateral branches will develop near the bu However, some response may be noted throughout the entire limb.

(4) Conserve fruiting wood. The first fruit of a tree is borne on th fruit spurs and short shoots from young trees, especially from the sca fold limbs. Many pruners remove these spurs and shoots, and as result the tree does not come into early bearing. It seldom grows mo than a few inches in length and can be shortened if necessary.

(5) In all pruning and training work, the pruner must have a visio of how the tree will look in future years. A mental picture should b made of how each branch will look, and how much space it will occup when fully grown. Thus, two parallel branches with 12 to 18 inch between them will eventually crowd, and one should be removed no Also, two branches crossing each other 5 or 6 inches apart near the bod of the tree will in time cause crowding and splitting, and one should b removed early.

(6) Pruning influences to a definite degree growth and other fun tional activities of the tree. It influences to a degree the character an proportion of stored food within the tree. The behavior of a plant s

ards growth and reproduction depends on the proportion of avail-
e carbohydrates and nitrogen. Fruit buds are apparently developed
a result of an abundance of carbohydrates in proportion to nitrogen
he buds in which the flower parts develop.

## RECOMMENDATIONS

Work at the North Carolina Experiment Station indicates that the
t system of training and pruning young apple trees to attain the
ects of pruning consists largely of corrective pruning in the form of
nning out, with a minimum of heading back—heading back only

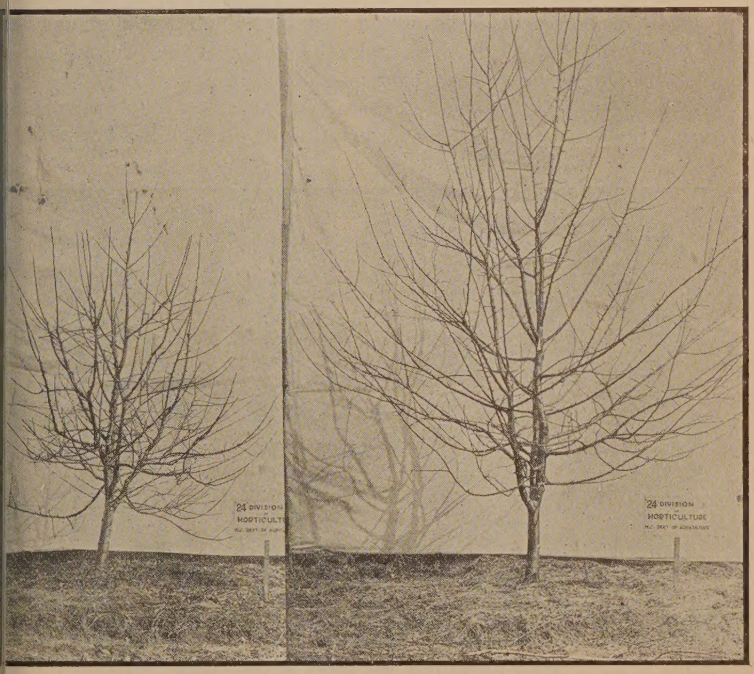


FIG. 1—Effect of heavy and light pruning on trees the same age.

en it is necessary to maintain the desired form of tree. It has been
nd that the modified leader type of tree lends itself best to this sys-
n of pruning, and to the achievements of the results sought.

The pruning of young apple trees is done primarily to modify the
m, but nevertheless the functional activities of the trees are greatly
luenced. Commercial growers throughout the country have incor-
tly followed the practice of pruning young trees severely for three or
r years after planting to develop vigorous and strong trees. They
ve erroneously thought that the vigorous annual growth following
avy cutting was an accurate index to the general size of the trees.

Recent investigations by the North Carolina Experiment Station ha shown that individual shoot growth is not a true index of the to growth and enlargement of the trees. The work at this station has ve fied the findings at other stations—that with heavy annual pruning, t total growth is less, the leaf surface is reduced, and the elaborated fo supply is lessened, with the result that the pruned trees are mu smaller, with a succulent type of growth that is opposed to fruitfulne This is clearly illustrated in Fig. 1, which contrasts the effect of lig and heavy pruning.

Light pruning results in trees coming into bearing from one to fo years earlier, and in trees which are more productive, as shown Fig. 2 and frontispiece. This system permits the admission of more su light to the interior of the trees, which stimulates the production of continuous fruit-spur system throughout the tree.

Trees, however, need some corrective pruning, and growers shou not go to the extreme of giving no pruning at all; for light pruning,

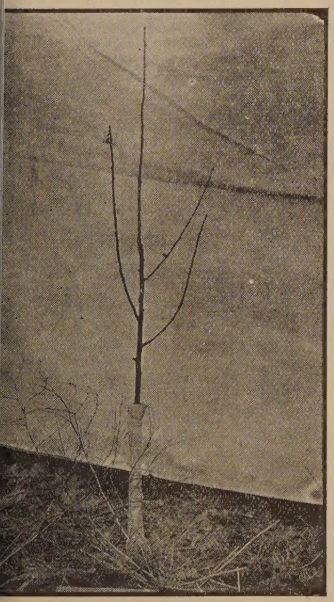
FIG. 2—Fruit from tree shown in frontispiece.

a corrective nature, during the first years of a tree's life, to properl space the framework branches and to keep them in balance, forms more desirable tree than one that is totally unpruned.

### Building the Modified Leader Type of Tree

The modified leader type is a combination of the open head and th central leader type of tree. In general, it is developed by training th tree to the leader type for the first four or five years, and from then o treating it as one would the open head. The tree is low-headed, sprea ing, and with six to ten scaffold branches distributed along and about central stem. It is not possible to secure the several scaffold limb

ı one season's growth and have them properly distributed and in
er balance; so the selection must extend over some three or four
s, starting two or three new scaffold limbs each year. After the
er number and distribution of scaffold limbs has been obtained, the
should be opened by discontinuing the leader. Two types of the
ified leader tree are found and will probably occur in any orchard
e the system is used. One of these types has a central stem, with
main scaffold limbs evenly distributed around and up and down it,
e the other has a trunk with either two or three whorls of about
e scaffold limbs each, with more space between the whorls than



IG. 3—Apple tree properly pruned after year's growth. Note spacing and distution of scaffolds and dominance of er. This tree was a one-year-old whip n set in the orchard.

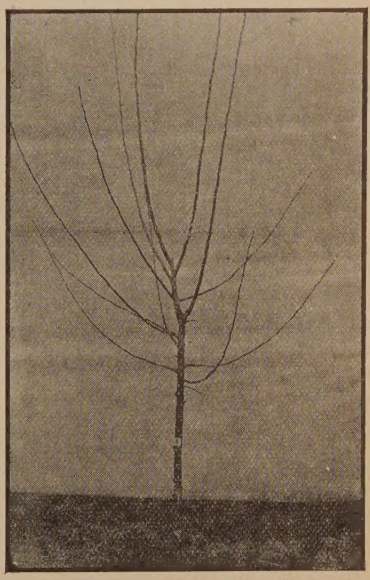


FIG. 4—Typical apple tree after two seasons growth and before second pruning.

een the individual limbs. This type is described as a two- or three- tree.

attempting to train trees so that they will closely approach this , the grower will find many difficulties, some of which are impossio overcome, but it is well for him to select one of these types as his and try to conform to it.

### Pruning at the End of the First Year

a one-year-old whip has been planted and headed at 28 or 30 inches, first year's growth will usually consist of an almost upright shoot uced from the uppermost bud and several shorter ones arising from

lower buds. In this case, two or three of them, well distributed al the trunk, and 6 to 8 inches apart, should be selected, in addition to uppermost one, and the others removed, as shown in Fig. 3. If leader is properly dominant and the scaffolds are balanced and not 24 inches long, they need not be headed back; if too long or not anced, they should be cut to balance, and the leader shortened.

### Pruning at the End of the Second Year

During the second season the leader and the scaffolds will be elonga and additional shoots will be produced. Fig. 4 shows a young ap tree after its second season's growth. With the second pruning, leader should be treated in much the same manner as in the previ year. In some cases the scaffold branches will probably have produced several laterals. In this case the central stem of each scaffold should be kept properly dominant. either by thinning out or heading back the laterals. In cases where no scaffolds were developed the year before, and there is a profusion of shoot growth from the main stem, two to four of the shoots well distributed about the trunk should be selected, and the others removed, as shown in Fig. 5. Fig. 5 also points out that certain ones of these scaffolds should be headed back to keep them in balance.

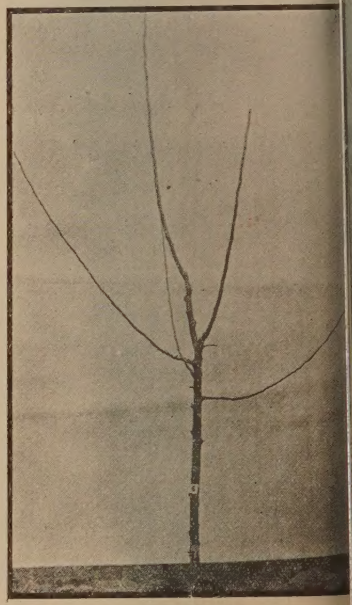


FIG. 5—Same tree as shown in Fig. after second pruning. Note how leader a certain scaffolds have been headed ba and many shoots thinned out.

### Pruning at End of Third Year

Fig. 6 shows the tree used in Fig. 5 after its third growing season. Fig. 7 shows this tree after it has been pruned. Note the balance between the scaffold, and how the leader is being kept dominant by thinning out and heading back. Note how most of the shoots that lat might interfere with the development of the scaffold limbs have be thinned out. At this pruning it will be seen that the second whorl scaffold limbs has been selected. It is planned in this tree to develo a third whorl at the fifth pruning. In many cases the third pruni will provide enough scaffold branches; but if not, others may be left the time of the fourth and fifth pruning. After enough scaffolds ha been provided, the leader should be removed just above the top later scaffold, and the tree opened, similar to an open center tree.

### Subsequent Pruning

Subsequent prunings should maintain the framework in proper balance and keep the tree open to allow the entrance of sunlight. The grower should develop scaffold branches carefully. They should be controlled from the standpoint of the tree as a whole, and also with regard to the relation of the main branches on each tree. If certain scaffolds are outgrowing others, the stronger-growing ones should be headed back. If the lower scaffold branches are not developed sufficiently, the upper ones must be cut back to prevent the lower ones

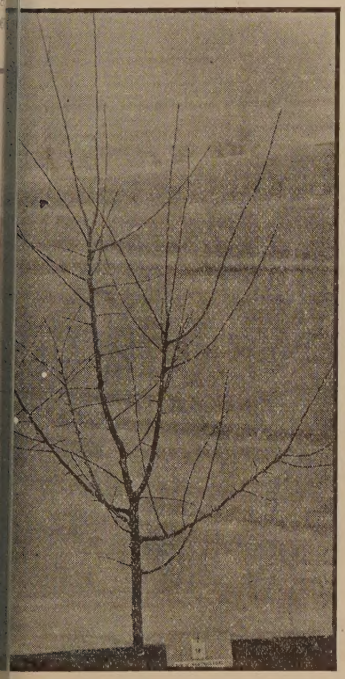


FIG. 6—Same tree as shown in Fig. 5, after three years growth, but before third pruning. Note twig and spur growth, a condition preceding fruiting.

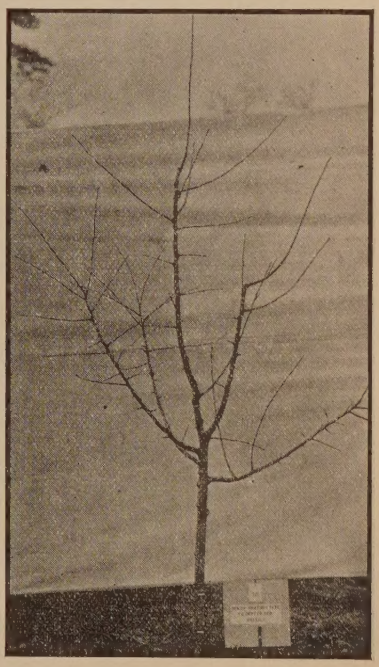


FIG. 7—Same tree as shown in Fig. 6, after third pruning. Note the balance between scaffolds, and dominance of the leader. Note how most of the shoots that later might interfere with the development of the scaffold limbs have been thinned out.

becoming suppressed as real scaffolds and the tree thrown out of balance. All main branches of the tree must be properly dominant and their balance carefully preserved, as shown in Fig. 8, which shows the tree used in previous figures after it has been pruned at the conclusion of its fifth growing season. It will be noted that all fruit spurs developed in the middle of the tree during this time have been left. It is on this growth that some of the first fruit of the tree will be produced.

More thinning out could have been practiced with profit in the t shown in Fig. 8. (Thinning out means the removal of the entire sh or branch, while by heading back is meant cutting off a part or reduc the length of a particular shoot or branch.) The scaffold limbs wo have been better developed.

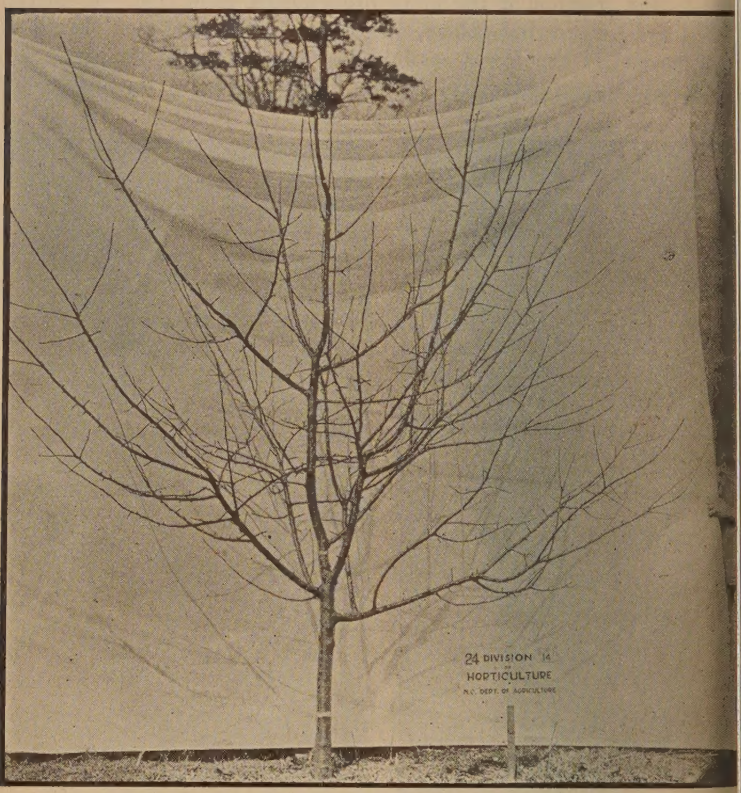



FIG. 8—Same tree as shown in Fig. 7, after five years development. Note twig and spur conditions, and development of additional scaffolds.

In actual practice, heading back of certain branches will be necessa to preserve balance between the scaffolds, but this should be held to minimum. Trees developed by a light system of pruning will appe too willowy or "leggy." However, this is more apparent than real, a these trees will be larger, stronger, and will be bearing crops sever years before trees which have been severely pruned.